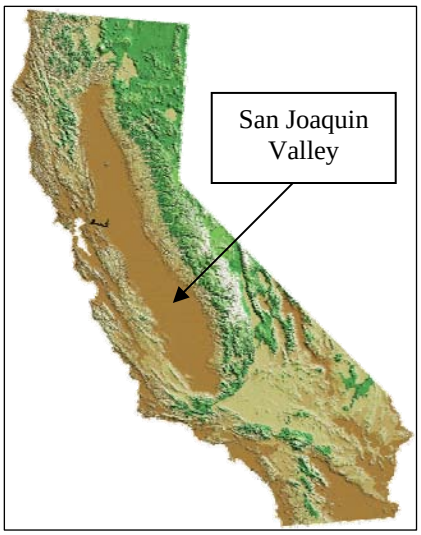
# USEPA Regional Geographic Initiative:

# Agricultural Sustainability Projects in California's San Joaquin Valley, 2001 - 2005

## Area Description



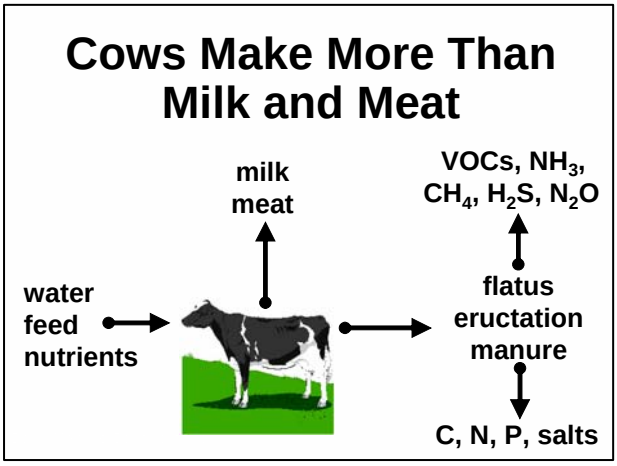

California's San Joaquin Valley, a great alluvium-filled trough 50 miles wide and 200 miles long, is some of the world's richest agricultural land. Agricultural production in the eight county region is valued at $20 billion per year and includes nearly 300 crops, many grown nowhere else in the nation. The Valley also is distinguished by some of the worst air quality in the nation, with high levels of ozone and particulate matter that contribute to high rates of respiratory illness. Pollution of ground and surface waters from pesticides, fertilizers, animal manure, and salts is also of concern. And in ironic contrast to the high value of agricultural production, the Valley also is one of the most impoverished regions in the United States, with per apita income far below the national average.

The EPA Region Regional Geographic Initiative has supported sustainable agriculture projects in the San Joaquin Valley for several years. Projects supported by RGI funding have benefited from strong collaboration with a diverse group of stakeholders who support more environmentally friendly agricultural products and production methods. These stakeholders include public health and environmental organizations, federal and state regulatory agencies, consumers, and the agricultural community.

"The RGI funding mechanism has been particularly helpful in advancing environmental protection in the agricultural industry. We have been able to support everything from reducing ozone emissions from dairies to improving public access to pesticide databases to using Agency seed funding to leverage philanthropic contributions to promote sustainable agriculture," said Laura Yoshii, Region 9 Deputy Regional Administrator.

## Project Description:
## Technologies for Cleaner Dairies

California is the nation's leading dairy state, and dairy products are California's most valuable agricultural product, worth nearly $5 billion per year. Over the last 30 years, the number of milk cows in California has more than doubled while the number of dairies has dropped by half. This concentration of the dairy industry has caused a dramatic increase in the average number of animals at new dairies, and a corresponding increase in the amount and concentration of animal waste. Three-quarters of the state's dairy cows are in the San Joaquin Valley, and they contribute to pollution of the region's air and water. Nutrients, salts,




bacteria, and organic matter in manure can pollute surface and groundwater. And decomposing manure emits air pollutants, including volatile organic compounds (precursors to the formation of both fine particulate pollution and ozone), ammonia (a precursor to formation of fine particulates), methane (a global warming gas), and odors. More efficient management and treatment of dairy manure could improve the quality of soil, air and water, create jobs and stabilize rural economies, provide a source of renewable energy, and reduce regulatory pressures on dairies.

RGI funding supported three dairy projects in the San Joaquin Valley:

**1. Reducing ozone air pollution: Identifying sources of VOC emissions from dairies**

The San Joaquin Valley is out of compliance with Clean Air Act standards for ozone. Volatile Organic Compounds (VOCs) are ozone precursors, and dairies are believed to be one of the largest sources of VOCs. However, little is known about which part of the dairy VOCs come from, or the reactivity of the various chemicals classified as VOCs to form ozone. Consequently, VOC emissions from dairies are a subject of much regulation and litigation. RGI funding supported a study at the University of California at Davis to help resolve these issues by quantifying the amount of VOCs emitted by cows fed two commonly-used rations. The studies were conducted in specially constructed chambers to allow for precise measurements of gas emissions from each cow separately from its manure. Results, released in summer 2005, revealed that

- There are significant technical challenges to determining emissions of ozone-forming chemicals from dairies. It is difficult - but necessary - to separate emissions from the manure, the feed, and from the cows themselves.
- Fewer ozone-precursors were emitted from cows and manure than had previously been assumed. Until now, the Air District had assumed that 8% of the gases emitted by cows and manure were VOCs. In this study, most (>99%) of the gas emitted by cows, feed and manure was methane; less than 1% were VOCs. The results were shared with the California Air Resources Board and the San Joaquin Unified Air Pollution Control District, which used the data to help determine Best Available Control Technologies for dairies to reduce emissions of air pollution.

**Stakeholders** for this project include the California dairy industry, regulatory agencies (California Air Resources Board, San Joaquin Valley Air Pollution Control District, EPA R9), and University of California Davis researchers. These stakeholders will use the information to quantify, and ultimately reduce, emissions of ozone-forming VOCs from dairies in the San Joaquin Valley.

**Leveraged Funding**: $75,000 in RGI funding was matched by $65,000 from Milk Advisory Board and $600,000 from Merced County.

**Additional Items**
Media coverage includes the following selected newspaper articles:

- Edie Lau, "Clearing the air: UC Davis scientist builds 'bovine bubbles' to find out how much gas cows produce – a key issue for agencies targeting livestock pollution," Sacramento Bee, July 11, 2004.
- Kathleen Hennessey, "Cowadunga! Study may set dairy air rules: Scientist measuring Holsteins' emissions," San Diego Union-Tribune July 27, 2005. <http://www.signonsandiego.com/uniontrib/20050727/news_1n27air.html>

A PowerPoint slide show of the research is on the website of the California Air Resources Board at < http://www.arb.ca.gov/ag/caf/lersymp.htm >

## 2. Identifying and Assessing Technologies to Improve Treatment of Dairy Manure

As dairies come under increased regulation for their contribution to air and water pollution, a large number of technologies have been proposed to improve manure management. EPA Region 9, in collaboration with the California Air Resources Board, formed the Dairy Manure Technology Feasibility Assessment Panel to assess the environmental and economic performance of these myriad technologies. The Panel received materials on more than 70 technologies, and reviewed the first 44 products. $15,000 in RGI funds paid for a contract with Tetra Tech EM, Inc., to assist EPA in data collection, formatting, and preparation of the Panel's report.

**Partners:** The Panel included representatives from

- federal agencies (US EPA, USDA Natural Resources Conservation Service)
- state agencies (California Air Resources Board, California Water Resources Control Board, California Integrated Waste Management Board, California Department of Food and Agriculture, California Energy Commission)
- University of California Cooperative Extension
- community and environmental organizations (Sustainable Conservation, Center for Energy Efficiency and Renewable Technologies, Natural Resources Defense Council)
- the California dairy industry

**Major Milestones/Accomplishments**
The Panel's report, "An Assessment of Technologies for Management and Treatment of Dairy Manure in California's San Joaquin Valley," was issued in December 2005 and is on the website of the California Air Resources Board at <www.arb.ca.gov/ag/caf/dairypnl/dairypanel.htm>

## 3. Developing Projects and Partners to Comprehensively Treat Dairy

The Local Government Commission organized a workshop, "*Waste to Watts - or What?*" in Modesto, CA in fall, 2004, which focused on energy production from manure. RGI funding ($10,000) supported a follow-up forum that expanded on the energy issues and engaged a

diversity of local government organizations, technology experts and the dairy industry in pursuing options for comprehensive treatment of dairy manure in the San Joaquin Valley. The goal was to determine collaboration, partnership and operational opportunities for capturing the resource potential (energy, fertilizer, organic soil amendments, bedding, etc.) of dairy manure while reducing environmental impacts (especially release from dairies of excess nutrients and air pollutants). The participants identified barriers and solutions for treating dairy manure in the Valley, proposed specific projects for implementing these solutions (e.g., biomass energy plants, compost facilities, wastewater treatment, etc.) and identified next steps (e.g., selecting sites, generating local support, determining infrastructure needs, conducting feasibility studies, raising funding, etc.) to evaluate and initiate these proposed projects.

**Partners and attendees** included California Department of Food and Agriculture, California Air Resources Board, California Water Resources Control Board, California Integrated Waste Management Board, California Energy Commission, US EPA, USDA Natural Resources Conservation Service, USDA Rural Development, University of California, environmental groups, dairy industry organizations, utilities, state and federal elected officials from the San Joaquin Valley.

**Major Milestones/Accomplishments**
The forum, "*Developing Projects and Partners to Comprehensively Treat Dairy Manure in the San Joaquin Valley*," was held January 11, 2006, in Modesto, CA.

An additional outcome of the project was the establishment of a strong collaborative relationship with Farm Pilot Project Coordination, Inc., a non-profit organization established by Congress to support projects that reduce nutrients emissions from animal feeding operations. FPPC managers attended the forum in Modesto, and subsequently issued a Request for Proposals that resulted in a $496,000 grant to support a dairy manure gasification pilot project at the Inland Empire Utilities Agency in Chino, CA (see FPPC Quarterly Report for January 1st thru March 31st, 2006, http://www.fppcinc.org/pdf/Q%20report%20January%20-%20March%202006%20(WEB%20VERSION)%20(2).pdf)

**Additional Items**
The following link is to a summary of the activities and comments from the forum:
http://www.lgc.org/events1/docs/sjv_dairy_forum06/sjv_dairy_forum06_sum.pdf
(PDF, 880 KB)

## Project Description:
## Public Access to Data on Pesticide Use and Exposure

Some 200 million ponds of pesticide active ingredient are applied to California crops each year. These materials increase crop yield, but also pose concerns about human and

environmental health. The Pesticide Action Network (PAN) created a database that is a unique resource for information on pesticide registration, regulation and toxicity. The web site is the largest and most comprehensive collection of this type of information in the world and receives more than 10,000 visits each month from state regulatory agencies, researchers, and consumers. EPA RGI funding in 2002 allowed addition of datasets on ecotoxicity, pesticides compatible with organic production and water bodies listed under the Clean Water Act as impaired due to pesticides.

**Stakeholders:** State departments of public health, state agencies responsible for regulation of pesticides, environmental organizations, community right-to-know organizations, and academic researchers provided input to improve the web interface, search capabilities, and content of the database. These partners also use the database, and EPA's Office of Pesticide Programs has linked its website to the PAN Pesticides Database website.

**Major Milestones/Accomplishments**
The PAN Pesticides Database is available on the web, fee of charge, at <http://www.pesticideinfo.org/Index.html>

**Leveraged Funding:** EPA Region 9 awarded three grants totaling $146,000 over four years to support the database development, including $20,000 in RGI funding. Additional funding for the database was provided by the US Agency for International Development, the United Nations Food and Agricultural Organization, and the Dutch Government Biodiversity Fund.

**Additional Items**
PAN received an EPA Region 9 2004 External Environmental Award for its work on the Pesticide Database.

## Project Description:
## Promoting Sustainable Agriculture by Partnering with Philanthropic Organizations

California has one of the world's largest and most productive agriculture industries. However, agricultural production in California is associated with myriad challenges in environmental and human health. A small ($10,000) RGI grant funded EPA's participation in and on-going coordination with Funders for Sustainable Food Systems (FSFS), an organization made up of philanthropic foundations that promote sustainable agriculture and food systems in California.

**Major Milestones/Accomplishments**
EPA RGI funding paid for reprinting and distribution to foundations and other stakeholders of *Roots of Change*, a report describing the environmental and human health challenges

facing California agriculture and food systems, and opportunities for implementing changes to make California agriculture more sustainable. Recipients included philanthropic foundations; public-interest non-profit organizations; local and national political leaders; university researchers, and agricultural extension agents. In addition, four quarterly meetings and an agricultural tour were held in 2003 to raise awareness among philanthropic foundations of the benefits of sustainable agriculture and food systems. A web site (http://www.foodfunders.org/) and an email list serve were also created to disseminate news on sustainable agriculture issues to foundations and other participants.

**Leveraged Funding:** Although not a specific deliverable for this grant, the grantee successfully leveraged substantial funding. The education and outreach efforts were so successful at raising awareness of sustainable agriculture issues among philanthropic foundations that FSFS formed a spin-off organization, the **Roots of Change Fund** (http://www.rocfund.org/), along with an advisory council of sustainable agriculture luminaries, the **Roots of Change Council** (http://www.rocfund.org/council.html), to raise and distribute grant funds. They committed to raise $6 million by 2007, and distributed the first $600,000 for projects in 2003, including

1. "**Building a Vivid Picture of Sustainable Food Systems"** (www.vividpicture.net), which solicited input from diverse sectors of food industry (production, processing, distribution, and retail), as well as regulatory agencies, consumer and environmental groups, and food policy experts, to describe how all sectors of the food system would operate if California transitioned to a more sustainable way of growing and distributing food. The project also identified key action steps to take in the near term to improve California's food systems.
2. **Sustainable Food Systems Partnership / "Ag and Environment Roundtable"** with state and federal agencies. The Partnership works with leaders in agriculture, environment, labor, and health to create a voice at the state level in support of food system reform and sustainability. This project is a collaboration of the California Sustainable Agriculture Working Group, the Community Alliance with Family Farmers, and the Natural Resources Defense Council.

**Stakeholders**: Foundations participating in the FSFS include The California Wellness Foundation, Columbia Foundation, Center for Ecoliteracy, Clarence E. Heller Charitable Foundation, Foundation for Deep Ecology, Fred Gellert Family Foundation, Gaia Fund, Marin Community Foundation, Richard and Rhoda Goldman Fund, Roy A. Hunt Foundation, True North Foundation, and William Zimmerman Foundation. A list of participants on the Roots of Change Advisory Panel is on the web (http://www.foodfunders.org/roc_fund.html) and includes representatives from academia, agricultural cooperative extension, farmers, food processors, state agencies, nutritionists, and chefs.

**Leveraged Funding**: $10,000 RGI award, leveraged $600,000 in contributions from the foundations.

**Project Description:**
**Environmental Standards and Certification for Production of Fruits and Vegetables**

EPA Region 9 used $145,000 in 2003 and 2004 RGI funds to support work by Protected Harvest (http://www.protectedharvest.org/), a non-profit organization dedicated to advancing and certifying the use of environmentally and economically sustainable agriculture practices through the development of stringent, transparent and quantifiable standards, incentive-based eco-labeling, and public education. Protected Harvest engaged the grower organizations to develop production standards for peaches, plums, nectarines, and processing tomatoes. The standards represent environmentally-preferable practices with accountability and incentive provided through certification of growers' adherence to the standards. The geographic target of these projects is the Central Valley of California, which ranks highest in the region for intensity of most pressing environmental impacts associated with agriculture. Environmental and regulatory priority issues include air quality associated with ozone and particulate matter, water quality impacts from chemical inputs and sediment loading and the associated TMDL developments, and farmworker risk from agrochemicals.


EPA Administrator Steve Johnson and Protected Harvest Executive Director Caroline Brickey at the launch of Protected Harvest's "Sustainable Tomato" project on August 23, 2005, in Sacramento.

**Stakeholders:** Protected Harvest worked in partnership with growers, food processors and commodity organizations to develop implementable performance standards for pest management and other agricultural practices that impact air, soil, and water quality, and incentives for their adoption. A collaborative approach to standard development was key to engaging industry partners. The stone fruit project is successfully anchored with one of the State's most substantial stone fruit labels, Ripe and Ready, which itself includes 4 major packer-shippers representing 35 - 40% of the State's fresh-market stonefruit. Ripe and Ready has committed to achieving certification of 50% of their growers within 5 years, which will represent adoption of practices that are documented to correlate with reductions in pollutant loading.

**Major Milestones/Accomplishments**

- Selection of stonefruit (peaches, nectarines, plums, apricots) as first target crop and processing tomatoes as second target crop

- Selection of Crop Advisory Committees for tree fruits and processing tomatoes
- Development of draft and final standards for both crops
- Enrollment of growers and processors in certification program
- Development of marketing strategies
- Development of self-assessment workbook for producers (funded by State Water Board). A similar workbook - developed by Protected Harvest in work with winegrape growers - proved to be a key and highly successful tool for outreach to growers.
- Development of marketing strategy for certified processing tomatoes
- Development of a chain-of-custody standard, a customized certification manual, and a water quality standard for tree fruits

**Leveraged Funding:** $145,000 in EPA RGI funding in 2003 and 2004 leveraged a $1 million grant award from USDA Conservation Innovation Grants program in 2004. Similarly, the processing tomato project, while still in the standards development phase, has leveraged a $600,000 dollar grant from State Water Board for development of the processing tomato grower self-assessment workbook.

**Additional Items**

Jim Wasserman, “Healthy tomato: Central Valley growers look to 'sustainable agriculture,'” Sacramento Bee, Wednesday, August 24, 2005, Business section, Page D1. <http://www.sacbee.com/content/business/story/13465470p-14306441c.html>